

obtained, is given by the latter observer in No. 8, vol. xii., of *Popular Astronomy*.

The altitude of the observing station was 4790 feet above sea-level, and the results lead Dr. Wilson to the conclusion that the increase in altitude, from Northfield to Midvale, reduced the necessary exposures, other conditions being the same, by about one-half. The two reproductions accompanying the account show excellent photographs of the America nebula and of the region between β and γ Cygni taken with a $2\frac{1}{2}$ inch Darlot lens with exposures of three hours and of two hours respectively.

DISTRIBUTION OF STELLAR SPECTRA.—In No. 1, vol. lvi., of the Harvard College Observatory *Annals* the distribution of stellar spectra, mainly in reference to the Milky Way, is discussed.

The spectra dealt with are those examined by Mrs. Fleming for the Harvard catalogues, and the work is not yet complete, the present publication dealing only with the results already obtained.

The number and proportion of each class of spectra in definite regions of the heavens, as determined from the discussion of 276 plates containing the spectra of 32,197 stars, are given in a series of tables and shown on a number of curves.

The results indicate that the universe consists of two portions, (1) the first-type stars, which occur in all regions, but preponderate in the formation of the Milky Way; (2) the stars having second- or third-type spectra, which show, in general, a uniform distribution over the whole sky.

The proportion of first-type stars increases as fainter objects are included, but with the Orion stars the opposite seems to be the case. Stars with peculiar spectra seem to congregate in the Milky Way, whilst, contrary to expectation, those having spectra of class F appear to be relatively fewer in the galactic regions.

ABSORPTION BY WATER VAPOUR IN THE INFRA-RED SOLAR SPECTRUM.—An interesting series of experiments has been made at the Smithsonian Astrophysical Laboratory, by Mr. F. E. Fowle, jun., in order to test the correctness of Bouguer's formula for calculating the amount of solar energy received after atmospheric absorption.

The results, so far as they go, show that the selective absorption of water vapour is well represented by Bouguer's formula and seems to depend only on the amount of the absorbent present, that is to say, the amount of the absorption produced by a given quantity of water vapour is the same, whether the radiations pass through a *great* thickness of *small* density or *vice versa*.

The absorption increases as the wave-lengths of the bands increase, and varies from about 10 per cent. near A (0.76μ) to nearly 100 per cent. at about 1.80μ .

No indication of a general water vapour absorption has been found in the region 0.68μ to 2.00μ .

Mr. Fowle's complete results, illustrated by some of the hograms obtained, are published in No. 1, vol. ii., of the quarterly issue of the *Smithsonian Miscellaneous Collections*.

THE SUPPLY OF VALUABLE FURS.

FEW persons, other than those in some way connected with the fur trade of this country, or who have had occasion to make statistical inquiries on the subject, have any conception of its enormous volume and value. Yet every thoughtful observer who strolls along the fashionable shopping streets of the metropolis at this season can scarcely fail to be struck with the number of establishments for the sale of furs and the richness and variety of their contents, or with the great extent that furs are worn by ladies. Any real and comprehensive idea of the magnitude of the trade can, however, only be gained either by attending the great London quarterly fur sales, such as those of Messrs. C. M. Lampson and Co., or by a study of the catalogues and price-lists of such sales. By a perusal of these documents the inquirer will gain some conception of the immense number of skins of the more valuable kinds of fur-bearing animals imported into this country alone; and when the great Continental sales, such as the Leipzig and Nijni-Novgorod fairs, are also taken into consideration, he will marvel where the supply comes from, and wonder that a clean sweep has not long ago been made of the chief fur-producing

species. Nevertheless, the supply of most descriptions of furs seems to be well kept up, and, with the exception of a few species, such as the sea-otter, the beaver in many districts, the West African guereza monkeys, and certain kinds of fur-seal, it does not appear that any of the valuable fur-bearing mammals are in present danger of extermination, or even of becoming unduly scarce. The truth is that we have probably little real conception of the abundance of such creatures in the more remote districts of North America and in the fur-producing countries of northern Asia.

To attempt, within moderate limits, any general account of the mammals which yield the more valuable kinds of furs is impossible, as it would be with the means at our disposal to give a survey of the world's fur trade, and we shall accordingly content ourselves with referring to some of the more striking items in trade circulars for the current year, and with making such notes on certain of the species there mentioned as may seem desirable. Here it may be recalled that there appeared in 1892 a valuable and interesting work on "Fur-Bearing Animals" by Mr. Henry Poland. This work, needless to say, is now altogether out of date, and it is much to be hoped that the author could see his way to the issue of a new edition, especially, if we may say so without offence, if he would seek the assistance of a professed naturalist in the revision.

We commence our brief review of the more interesting items in the 1903-4 sale-lists by referring to some of the most valuable descriptions of furs employed as articles of dress or as carriage rugs, a large proportion of which are yielded by the Carnivora, and especially by members of the family Mustelidæ. One of the foremost places in this respect is occupied by the sea-otter (*Latax lutris*), an animal which formerly abounded on the coasts of Kamchatka and the Aleutian Islands, but which now stands in imminent jeopardy of extermination unless prompt measures are taken for its protection. Between the years 1772 and 1774 some 10,000 skins of this species were taken in the Aleutians, while at the end of the eighteenth century the annual take was 120,000 in certain newly discovered haunts in Alaska. This number, however, soon fell to 15,000, and when Alaska was ceded to the United States it had sunk to 700. A temporary improvement then took place, but in 1901 the number had fallen to 406. In 1903 Messrs. Lampson sold 463 skins, but they had none to offer in January, 1904, and there are none down in their October list, the latter deficiency being perhaps due to the recent loss of a whole cargo of furs from the Kommandorski Islands and Kamchatka. Of late years 100*l.* is no uncommon price for a sea-otter pelt, while from 200*l.* to 300*l.*, and even, it is said, 500*l.*, have been paid for unusually fine skins.

These prices are, however, paralleled by those given for American silver or black fox (*Canis vulpes argentatus*). Nowadays the trade distinguishes the pure black from the silver or white-tipped skins. Black skins are said to have been sold in St. Petersburg at from 300*l.* to 800*l.* each. In London a pair of silver skins realised 480*l.* and an inferior pair 200*l.* in 1902, but single skins are reported to have fetched 200*l.* Messrs. Lampson offered 670 skins of this fox in 1903, and have 55 in their current October list. The white and blue phases of the Arctic fox (*Canis lagopus*), which are the winter dress of different animals, although often regarded as the winter and summer coats of the same form, have of late years become very fashionable. Of the former 20,341, and of the latter 3685, were sold by Messrs. Lampson last year, but none of the blue variety appear in this autumn's catalogue, against 57 in October, 1903, and it would accordingly seem that the demand is telling on the supply. White fox skins, which some years ago sold for between 2*s.* 6*d.* and 1*s.* 5*s.* each, have recently risen to from three to five guineas, although they are now declining; on the other hand, blue fox, which has long fetched from ten to fifteen guineas per skin, appears to be rising in value. Both white and blue fox come from the northern parts of both hemispheres; the blue should be a pure bluish French grey.

Of lynx skins 5828 were sold by Messrs. Lampson in 1903, and 6316 were offered this autumn, the catalogue prices ranging between 2*s.* and 4*s.* for good samples. Probably most of these skins belong to the circumpolar *Felis lynx*, although they may include some of the American *F. rufa*.

Another handsome fur now in considerable demand is that of the glutton or wolverine (*Gulo luscus*), of which 47,139 skins were sold last year by one firm, the catalogue price ranging this autumn from 16s. to 34s. for good samples. The sales of Russian sable (*Mustela zibellina*) by the same firm last year reached the enormous total of 29,547, which compares with a total of 9247 for the whole of London in 1891, an increase which seems to imply either the tapping of a fresh source of supply or an undue drain on the normal stock. The catalogue prices range from 10s. to 15l. per skin, but specially fine skins will fetch from 50l. to 70l. each. As its trade name implies, all the best sable comes through Russia. "Kolinsky" or Siberian sable (*M. sibirica*) is the trade name of an allied species of which enormous numbers of skins come into the market, Messrs. Lampson quoting 472,796 for last year; the price is, however, low, usually less than two shillings, and now declining.

Ermine (*M. erminea*), of which the returns for 1903 are not given in the list before us, has recently risen 30 per cent. in value; 1379 skins were sold in January, 1903, and 461 this October. From 20s. to 180s. per "timber" of 40 skins was the price some years ago. Ermine is imported both from Russia and America. When made up with specks of black fur instead of with the black-tipped tails, it is called minever. Japanese sable, of which only 179 skins were sold by Messrs. Lampson in 1903, is represented by 1211 this autumn, a circumstance which may indicate that our allies are endeavouring to make as much as possible out of their exports.

A similar increase is noticeable in the case of Japanese mink (a species it is a little difficult to identify zoologically, but which would appear to be allied to *M. sibirica*), of which 13,728 skins were disposed of at the sales in 1903, while 7228 were offered this autumn, against 3543 at the corresponding sale of last year. Of American mink (*M. vison*) the imports are always heavy, and for 1903 Messrs. Lampson record 253,001 skins, this being about 100,000 less than the total number sold in London in 1901. Prices range from 1s. to 13s., but are on the decline. The various kinds of real marten, such as *M. martes* and *M. americana*, with 55,106, and the inferior sorts known in the trade as "baum" and "stone" (*M. foina*), with 10,940 and 8323 in the past year, bulk less large, although prices range higher, fine pelts of the pine or American marten realising from 30s. to 40s.

Leaving certain others of the marten group, we pass on to otters (*Lutra vulgaris*, *L. canadensis*, &c.), of which 14,757 pelts were disposed of in sales last year, the catalogue prices in January ranging to as much as from 50s. to 60s. With modern methods of curing, the handsome black and white fur of the various species of skunk (*Mephitis* and *Conepatus*) has come into extensive and fashionable use, no less than 948,447 skins having been sold last year, the price ranging from about 1s. to 7s. each. Of badger skins (*Meles taxus*) the number sold by the same firm was 13,543; formerly the price was from 1s. to 2s. per skin, but the range in the list varies now from 4d. to 13s.

Of the larger land Carnivora, the skins of which are used for fur rather than for floor rugs, we may mention the sale last year by Messrs. Lampson of 47,139 wolf skins and 12,834 bear skins. Of the former the catalogue price ranges from 1s. or less to 30s., while for the latter, which include the brown, black, grizzly, and white species, prices up to 4l. are quoted. Reference has already been made to the silver, white, and blue foxes; in addition to these are quoted 62,052 skins of red fox (*C. vulpes*, &c.), 2957 of the cross-fox (*C. v. pennsylvanicus*), 64,431 of the American grey fox (*C. cinereo-argenteus*), and 2186 of the kit-fox (*C. velox*). Raccoon skins number 268,190 in the list under consideration, while 9650 civet skins are quoted in the January list.

Among rodents, beaver skins total 16,504 in the list before us, while the Hudson Bay Company sold in January last 34,806, the latter number comparing badly with the 63,419 sold by the same company in January, 1891, which was greatly inferior to the sales of half a century or so earlier. In 1891 the price varied from 5s. to 69s. per skin; in Messrs. Lampson's list quotations range up to 30s., but there had been a fall of 12½ per cent. from the previous year. The next largest fur-bearing rodent is the South American

coyup (*Myopotamus coypu*), known in the trade as nutria, of which 80,269 skins appear in last year's sale-list. Far more valuable are, however, the much smaller beautiful silver-grey pelts of "real" chinchilla, of which 23,587 were sold last year by Messrs. Lampson, 60s. to 240s. per dozen being the price quoted by Mr. Poland in 1891, but a maximum of 310s. appearing in the list before us. I take it that by "real" chinchilla is meant the typical *Chinchilla lanigera*, although the latter name is applied by Mr. Poland's book to the "bastard chinchilla" of the trade, which one would have thought meant one of the species of *Lagidium*. Be this as it may, "bastard chinchilla" is represented by no less than 132,996 pelts in Messrs. Lampson's 1903 sales, the maximum price being 145s. per dozen.

Of the smaller and less valuable rodent furs briefer notice must suffice, the chief interest connected with these being the enormous numbers in which they are imported. Thus musquash (*Fiber zibethicus*) is represented by no less than 2,979,460 pelts of the normal, and by 117,412 of the black phase, while 1,678,667 skins of the former were disposed of at the January sale this year. Squirrel (of various kinds), on the other hand, totalled only 142,501. Rabbit and hare skins are not of sufficient value to find a place in these sale-lists. Among marsupials, skins of the so-called Australian opossums, that is to say, various species of phalangiers, press hard on musquash skins in point of numbers, 2,455,765 being the quotation in last year's list. True, or American, opossum (*Didelphys*), on the other hand, totals only 168,396. Of kangaroo skins the number in the same list is 21,963, while wallaby skins (that is to say, those of the smaller kinds of kangaroos) reach 520,087, and wombat skins 255,332.

An item of considerable interest in the sale-list of January, 1904, is 343,996 mole skins, ranging in price from 1s. to 7s. 3d. per hundred, such prices being stated to be exceptionally low, and not, one would think, paying for the trouble of collecting. No year's total for mole skins is given, but since Mr. Poland mentions "several thousands" as being the annual collection in 1891, it would seem that the demand—perhaps for motoring coats—has vastly increased of late years. Another item evidently connected with motoring is that of 403 musk-ox skins at the March sale of last year. The trade in these skins has only lately been developed, and it cannot but be looked upon with suspicion by naturalists, as the musk-ox might easily be exterminated.

Although the total numbers of skins offered at sales in January last compared well with those of the preceding year, prices ruled lower, which may be accounted for by the general commercial depression.

In addition to Messrs. Lampson's sales, it should be mentioned that there are the Hudson Bay Company's sales, as well as several smaller fur sales in London. In January of the present year (after the loss of a valuable cargo of furs at sea) the Hudson Bay Company sold 34,806 beaver skins, as already mentioned (against 47,777 the preceding year), and 923,053 musquash pelts (against 1,482,670 in 1903). The skins disposed of at the smaller sales we have not space to quote. We may refer, however, to the following items in Messrs. Culverwell, Brooks, and Co.'s sale catalogue of this October. These are 9280 Australian opossum, 3214 "wallarine" (smaller kangaroos), 673 chinchilla, 934 fox, 2772 wolf, and 2313 African monkey skins.

The latter probably belong in great part to the West African guereza (*Colobus vellerosus*), the species already referred to as, according to consular reports, being in danger of extermination on account of excessive pursuit.

As regards the prospects of the trade in fur-seal pelts for the current season, Messrs. Lampson, after referring to the loss by shipwreck of the Kamchatka Commercial Co.'s vessel already mentioned, and adding that in consequence they may have no Copper Island fur-seals to offer, write as follows:—

"The Alaska seal-catch this year amounts to 13,134 skins, as against 19,378 last year. . . . The North-west catch is not yet completed, but our receipts to date are about the same as at this time last year. With regard to the Lobos Island seals, no news has been received so far. . . . The total supply of seals this season is likely to fall considerably short of last year's quantity."

From the introductory statements this diminution may, however, be merely temporary, and need not necessarily indicate a permanent falling off in the supply of fur-seal pelts.

In respect to skins used solely for rugs or ornamental purposes, very few words must suffice. In Messrs. Culverwell, Brooks, and Co.'s list for October of this year appear 100 South American guanaco skins (from which the beautiful orange carriage-rugs are made), 24 tiger, and 266 leopard skins, while Messrs. Lampson's January list gives 184 tiger and 557 leopard skins (inclusive of snow-leopard and "leopard-cat").

The leopard skins range in price from 10s. or less to 34s. (55s. for snow-leopard), while tiger skins vary from 2l. to 60l. each.

Imperfect and sketchy as this review of recent London fur sales necessarily is, it serves to give some idea of the enormous—we may almost say appalling—number of wild animals annually slaughtered for the sake of their pelts. What, however, it does not—and cannot—give is the effect that this continuous slaughter is having on the numbers of the various species of fur-bearing animals throughout the world.

This is what naturalists want to know from the point of view of zoology, and it is also what the fur trade community ought to desire to know from the point of view of their own and the world's interest. Of late years furs have become increasingly fashionable, with a corresponding appreciation in price; but as to whether this increased demand is having any serious effect on the numbers of fur-bearing animals in general we appear, except in the case of a few species, such as the sea-otter, the beaver, the West African guereza, and the fur-seals, to be in a state of utter and hopeless ignorance.

R. LYDEKKER.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The new statute, the object of which is to exempt candidates for honours in mathematics or in natural science from Greek in Responsions, was brought before Congregation on Tuesday, November 29. The changes proposed in the statute were in strict accordance with the resolutions passed by Congregation in Hilary Term, 1904, except in one small detail. Candidates for honours in mathematics or in natural science have two courses open to them under the proposed statute. They may offer the subjects required by the present regulations, viz. Greek, Latin, arithmetic, and elementary algebra or Euclid, or in place of Greek they may substitute French or German, together with a mathematical or scientific subject to be prescribed by the board of studies for Responsions. Candidates who had not offered Greek would be allowed to substitute an additional knowledge of the subject-matter of the Bible for that part of the examination in Holy Scripture which involves a knowledge of the Greek text of the Gospels. The statute was lost by 200 votes to 164.

Dr. William Osler, F.R.S., regius professor of medicine, has been elected to a studentship at Christ Church.

A NEW professorship of applied chemistry has been established at Trinity College, Dublin. Mr. Emil Alphonse Werner, assistant to the professor of chemistry, has been appointed as the first occupant of the new chair.

WE learn from *Science* that Park College, near Kansas City, has received an additional endowment of 20,000l., of which 5000l. has been given by Dr. D. K. Pearson; and that at a recent meeting of the trustees of Columbia University gifts amounting to about 9400l. were announced by the trustees. Among these was the sum of 3000l. from General Horace W. Carpenter.

THE Minister of Public Instruction for Austria has issued a decree concerning the admission to the universities of students from the Realschulen, according to which those wishing to be on the same footing as candidates from the Gymnasias are required to pass an additional examination, held twice a year, in Greek, Latin, and philosophy. Candidates may prepare for this examination either by private study or by courses held at certain secondary schools.

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It would do much good if everyone spoke their minds on the subject of free libraries as straightforwardly as did the Countess of Jersey last Saturday afternoon. When laying the foundation stone of a library which the generosity of Mr. Carnegie is providing for Hanwell, she touched on the great usefulness of books of reference, especially with regard to the particular life-work of the reader. In fact, one would judge that novels would find but a small place on the shelves if Lady Jersey were to choose all the books, for she very sensibly pointed out that the best volumes of fiction can now be bought for a few pence, and that more expensive books and those more difficult to get should form the bulk of a public library.

At the winter session of the General Medical Council last week a report was considered from the Education Committee on the proposals for a school certificate submitted to the council recently by the Board of Education. After discussion it was decided to inform the Board of Education (1) that any well considered plan which would tend to a diminution in the number of examinations in preliminary subjects of education, and to a unification of standard of those which remain, would meet with the hearty approval of the Medical Council. (2) That if the standard of the examination contemplated in the scheme were such as to be generally accepted for matriculation by the universities, the council would be prepared to recognise it as qualifying for entrance on a course of professional study. (3) That, pending the general adoption of a uniform system of unification of educational tests, the council would welcome the establishment under the Board of Education of a central board for the purpose of classifying examinations according to standard and arranging for the mutual recognition of certificates; and, further, that they regard the establishment of such a board as highly desirable from an educational point of view.

SOCIETIES AND ACADEMIES.

LONDON.

Entomological Society, November 2.—Prof. E. B. Poulton, F.R.S., president, in the chair.—Mr. J. E. Collin exhibited a specimen of *Platyphora lubbocki*, Verr., a species of Phoridae parasitic upon ants. No specimen has been recorded since the one originally bred by the present Lord Avebury in 1875, and described for him by Mr. G. H. Verrall in the *Journal of the Linnean Society* for 1877.—Mr. P. J. Barraud exhibited an aberrant *Epinephele jurtina* (janira), ♂, taken by him this year in the New Forest, in which the usual apical spots were absent from the fore-wings, giving the specimen a curious appearance, noticeable even when flying.—Mr. J. Edwards sent for exhibition three specimens of *Bagous lutosus*, Gyll., one found by himself on Wretham Heath, Norfolk, on August 4, 1900—the first authentic British example—and two taken in the same locality by Mr. Thouless on May 22, 1903; also *Bagous glabrirostris*, Herbst., from Camber, Sussex, for comparison.—Dr. T. A. Chapman exhibited bred specimens of *Hastula* (*Epagoge*, Hb.?) *hyerana*, Mill., from larvæ taken at Hyères last March, and said the fact that the pale forms only have hitherto been known, whereas of those bred nearly half are dark, suggests either that really very few specimens are in collections—which is the most probable case—or that melanism is now affecting the species.—Mr. W. J. Kaye exhibited specimens of the moths *Castnia fonscolombei* and *Protambulyx ganascus* showing protective and warning coloration of the two species.—Mr. H. W. Andrews exhibited specimens of *Eristalis cryptarum*, F., and *Didea alneti*, Flin., two species of uncommon Syrphidae from the New Forest.—Mr. Edward Harris exhibited a brood of *Hemerophila abruptaria* reared by him this season, together with the parents, a dark male and a normal female, showing considerable variation.—Mr. Gervase F. Mathew, R.N., exhibited some beautiful and interesting examples of *Leucania favicolor*, Barrett, including the varieties described by Barrett in the current volume of the *Entomologist's Monthly Magazine* (p. 61), and, more recently, by Tutt in the *Entomologist's Record* for this year. He also exhibited a series of twenty-four *Campogramma fluviala*, the descendants of a wild pair